



DEPARTMENT OF PHYSICS

COURSE OUTCOMES

SEMESTER I

Subject Name: MECHANICS AND SOUND Subject Code: U22PHC11

In this course the students will

COs	CO Statement
CO1	Learn different types of impact and projectile motion
CO2	Understand the concepts of Centre of Gravity of different shapes of solids and centre of Pressure of laminas immersed in liquid
CO3	Get knowledge about angular momentum, torque and Rocket Motion
CO4	Learn the Characteristics of wave motion and Interference of Sound waves
CO5	Verification of laws of transverse vibration of strings and understanding acoustics of buildings

Subject Name: ALGEBRA & TRIGONOMETRY Subject Code: U22MAAX11

In this course the students will

Cos	CO Statement
CO1:	Gain knowledge on various series like binomial series, logarithmic series, trigonometric series.
CO2:	Develop the ability to solve equations and understand the nature of roots of higher order equations.
CO3:	Acquire knowledge on hyperbolic functions.

Subject Name: SOLAR THERMAL AND PHOTOVOLTAIC SYSTEMS

Subject Code: U22PHS11/ U3PHS11

In this course the students will

COs	CO Statement
CO1	Understand the fundamentals and need for conventional Energy Sources and non-conventional Energy Sources.
CO2	Study about Sun and Solar radiation
CO3	Learn about Solar collector, Solar water heater and Solar Cookers
CO4	Learn about Solar Furnaces, Solar Dryer and Solar Distillation
CO5	Study the Solar PV systems and their applications

Subject Name: MATERIALS SCIENCE

Subject Code: U22PHS12/ U3PHS12

In this course the students will

COs	CO Statement
CO1	Study bonding in solids and crystal structure
CO2	Understand the electronic theory of solids
CO3	Understand the behaviour of Dielectric materials
CO4	Study Magnetic properties of solids



CO5	Study Nanophase materials and nonlinear materials
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SEMESTER II

Subject Name: PROPERTIES OF MATTER

Subject Code: U22PHC21

In this course the students will

COs	CO Statement
CO1	Understand the principles of Elasticity
CO2	Study about bending of beams
CO3	Understand the concept of fluid dynamics and Osmosis.
CO4	Understand the concepts of viscosity and its applications.
CO5	Learn the importance of surface tension of liquids

Subject Name: HEAT AND THERMODYNAMICS

Subject Code: U22PHC22

In this course the students will

COs	CO Statement
CO1	Derive ideal gas equation, transport phenomena of gases
CO2	Study the fundamentals of thermodynamics, Carnot engine and to understand reversible, irreversible process, entropy and change in entropy
CO3	Understand conduction & convection and to study the fundamental laws of black body radiation
CO4	Understand the concept of specific heat capacity and experimental determination of C_v & C_p
CO5	Study Joule-Thomson effect, liquefaction of gases and to understand the working of Refrigerator & Air-conditioner

Subject Name: LAB : GENERAL PHYSICS – I

Subject Code: U22PHCP21

In this course the students will

COs	CO Statement
CO1	Student can get basic practical knowledge about General Physics
CO2	Understand the practical and theory knowledge of Lee's disc method and Spectrometer
CO3	Do the experiments on Sound
CO4	Do experiments based on Viscosity
CO5	Do experiments based on Surface Tension

Subject Name: CALCULUS AND MATRICES Subject Code: U22MAAX21/ U2MAA2X2

In this course the students will

Cos	CO Statement
CO1:	Apply the reduction formula to solve problems in integral calculus.
CO2:	Utilize the concept of vector differentiation to find the curl, divergence of a given vector.



CO3:	Construct the evolutes of any curve using differential calculus.
CO4:	Develop the skills of solving simultaneous equations by making use of the rank of matrices.
CO5:	Find the eigen values, eigen vectors of a given matrix.

Ancillary Papers

SEMESTER I

Subject Name: MECHANICS, PROPERTIES OF MATTER AND SOUND

Subject Code: U22PHAX11/ U1PHA1X1

In this Course, the students will

COs	CO Statement
CO1	Understanding the concepts of projectile motion
CO2	Knowing about friction and mechanics of rigid body
CO3	Understanding the concept of gravity and gravitation
CO4	Learning elastic properties of bodies
CO5	Understanding basic principles of sound

SEMESTER II

Subject Name: THERMAL PHYSICS

Subject Code: U22PHAX21/ U1PHA2X2

In this Course, the students will

COs	CO Statement
CO1	Learning fundamentals of heat
CO2	Knowing isothermal and adiabatic processes
CO3	Understanding the principles of conduction, convection and radiation
CO4	Getting knowledge about kinetic theory of gases
CO5	Understanding the principles of thermodynamics

SEMESTER I

Subject Name: Lab: Physics Practical –I

Subject Code: U22PHAXP21/ U1PHA2PX

In this Course, the students will

COs	CO Statement
CO1	Learning to measure Young's modulus by bending methods
CO2	Verifying laws of vibration using sonometer
CO3	Determining the acceleration due to gravity using compound pendulum
CO4	Determining of Thermal conductivity of bad conductor
CO5	Learning to measure the Refractive index of glass Prism using Spectrometer



COURSE OUTCOME

SEMESTER III

ELECTROSTATICS AND CURRENT ELECTRICITY

Subject Code: U3PHC3

- To understand the fundamentals electrostatic parameters Electric Field, Gauss's law and its application Electric Dipole.
- To study about Electric Potential, Capacitances different types Capacitor and Energy Stored in Capacitor.
- To learn about Ohm's law, Kirchhoff's Laws and its applications.
- To impart knowledge about Thermoelectricity, Chemical Effect of Current and different types of Cells.
- To study the Theory of Dielectric, Applications of Laplace's equation and experimental method to find dielectric constants.

ALLIED MATHS - Differential Equations and Laplace Transforms

Subject Code: U3MAA3X3

- To enable the students to know the methods of solving differential equations and Partial differential equations
- To understand the Laplace transform, inverse Laplace transform and its applications.

ALLIED - General Chemistry-I

Subject Code : U3CHA3X1

- To know the basics ideas about organic chemistry
- To know the details about periodic table and its periodic properties.
- To learn Chemical equilibrium and its importance in industrial processes
- To acquire knowledge about petroleum and petrochemical products.

SEMESTER IV

ELECTROMAGNETISM

Subject Code: U3PHC4

- To study about laws of induction and methods to find self and mutual inductance of coils.
- To study about the nature of transient currents in LR and CR circuits.
- To learn about the current variation in series and parallel resonance circuits and AC Bridges.
- To learn about the properties of magnetic materials.
- To impart knowledge about importance of Maxwell's equations in electromagnetism.



ALLIED - Statistics, Groups and Fourier Series

Subject Code : U3MAA4X4

- To know the statistical methods
- To introduce the abstract systems and Fourier series

ALLIED - General Chemistry-II

Subject Code : U2CHA4X2

- To learn the basics gaseous state
- To get the idea about the polymer and its applications.
- To adequate knowledge about nuclear chemistry

ALLIED LAB - Volumetric Analysis

Subject Code : U2CHA4PX1

- A double titration involving making up of the solution to be estimated or single titration involving making up of the solution to be estimated and the preparation of standard solution.



COURSE OUTCOME

SEMESTER V

ANALOG ELECTRONICS

Subject Code: U2PHC51

In this course, the student will

- know about semiconductor principles and mobility of charges in semiconductors
- get knowledge about Diodes and Transistor biasing and their characteristics
- able to know the various applications of diodes in wave shaping circuits and power supplies
- learn about the construction and performance of different transistor amplifiers
- understand the feedback principles and working of oscillators

OPTICS & SPECTROSCOPY

Subject Code: U2PHC52

In this course, the student will

- know about the properties of lenses and working of system of lenses
- get knowledge of interference, theory of interference and experiments using interference
- get knowledge of diffraction principle and its types
- understand the different kinds of spectroscopic techniques and their applications

ELECTRICAL WIRING

Subject Code: U1PHS51

In this course, the student will

- understand the basics of AC circuits.
- learn about Electrical Installations.
- acquire the knowledge of Design of Simple Electrical Circuits.
- Will know about the guidelines for sub-circuits, fittings and Simple Wiring Schemes
- know about electrical protective devices and electrical estimation.

PHYSICS OF HUMAN ANATOMY

Subject Code: U1PHS52

In this course, the student will

- understand the biophysics of muscles and bones
- know the physics of audition and about human ear
- understand the functioning of Retina and photoreceptors of eye
- learn about neuro biophysics and function of nerve system



BASIC PHYSICS

Subject Code: U2PHN51

In this course, the student will

- get knowledge about the Physics and its scope
- know about the Galaxies, Origin of the Universe and the Solar system
- study brief history and sources of light
- get knowledge about applications of refraction and diffraction of sound and acoustics of buildings
- understand the communication systems and various types of communication

General Chemistry - III

Subject Code: U2CHA5X3

- To know the basic requirements of chemical calculations.
- To acquire fundamental knowledge in bonding.
- To gain fundamental knowledge about adsorption, catalysis and co-ordination compounds.
- To study the principles water analysis.

SBE- EMPLOYABILITY SKILLS

Subject Code: U1PS51

- To enrich the Employability Skills by imparting Reasoning skills, Aptitude skills and General Knowledge.

SEMESTER VI

ATOMIC AND NUCLEAR PHYSICS

Subject Code: U1PHC61

In this course, the student will

- understand atom models.
- study the quantum mechanical explanation for the atom model.
- study the nuclear composition and its properties
- understand the nuclear structure.
- understand the Nuclear fission and fusion.

DIGITAL ELECTRONICS

Subject Code: U3PHC62

To understand different number systems and Boolean algebra.

- To get knowledge about different logic gates.
- To study the different arithmetic circuits.
- To understand the functioning of flip-flops, counters and Registers.



CLASSICAL AND STATISTICAL

Subject Code: U4PHC63

In this course, the student will

- understand the basic concepts classical mechanics.
- get knowledge about D'Alemberts principle and its applications
- Will know the superiority of Lagrangian mechanics over Newtonian Approach.
- understand the fundamental postulates and distribution laws of statistical mechanics.

BIO MEDICAL INSTRUMENTATION

Subject Code: U2PHS61

In this course, the student will

- get idea about design of medical instruments and components of the Biomedical instrument system
- get knowledge about characteristics of bio potential recording system
- understand the operation and uses of ECG and EEG equipments
- understand the application of Lasers and Computers in the field of medicine

SOLAR ENERGY

Subject Code: U2PHN61

In this course, the student will

- get knowledge about the Energy Sources
- understand the Solar Energy Basics
- study the different types Solar collectors
- know about structure and working of Solar water heaters
- study the solar dryer, solar distillation and solar thermo-mechanical systems.

General Chemistry - IV

Subject Code: U3CHA6X4

- To study the basics of chemical equilibrium.
- To acquire basic idea about drugs.
- To gain knowledge about the chromatographic techniques.
- To understand the role of bio-organic materials.

Ancillary Lab II – Organic Qualitative Analysis

Subject Code: U1CHA6PX2

- To gain fundamental knowledge about organic analysis



VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA NADAR COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

[Re-accredited with 'A' Grade by NAAC]

Virudhunagar – 626 001.

COURSE OUTCOME

SELF LEARNING

RENEWABLE ENERGY SOURCES

Subject Code: U1PHSL51

- To get knowledge about Sun as a source of energy
- To study about solar thermal and photovoltaic devices
- To understand the basic concepts of Wind, Biomass and Geothermal energy sources



DEPARTMENT OF PHYSICS

COURSE OUTCOME – M.Sc. (Physics)

SEMESTER I

Subject Name: MATHEMATICAL PHYSICS -1

Subject Code: P22PHC11/ P19PHC11

In this course the students will

COs	CO Statement
CO1	Understanding Gauss divergence theorem and Stoke's theorems
CO2	Applying vectors in hydrodynamics and heat flow in solids
CO3	Understanding the algebra of matrices and eigen value problems
CO4	Getting knowledge of power series technique
CO5	Understanding Bessel's and Legendre's differential equations and their orthogonal properties.

Subject Name: ELECTRONIC CIRCUITS AND SYSTEMS

Subject Code: P22PHC12

In this course the students will

COs	CO Statement
CO1	Understanding function of Three layer and Four layer devices
CO2	Understanding the technology of integrated circuits
CO3	Learning the basic of op-amp characteristics and its applications
CO4	Getting the knowledge of Signal generators and their design
CO5	Learning the basics of optoelectronic devices and its applications

Subject Name: CLASSICAL MECHANICS

Subject Code: P22PHC13

In this course the students will

COs	CO Statement
CO1	Solving the Lagrangian equations and Hamilton's equation from the Variational principle
CO2	Understanding the concepts of the Canonical transformations, Poisson's brackets and Hamilton-Jacobi equations
CO3	Understanding Canonical Transformations and the Hamilton – Jacobi Theory
CO4	Getting knowledge of theory of oscillations of small amplitudes
CO5	Learning the problem of two bodies moving under the influence of a mutual central force as an application of the Lagrangian formulation.



Subject Name: ELECTRONIC COMMUNICATION Subject Code: P22PHE11

In this course the students will

COs	CO Statement
CO1	Getting knowledge of basic elements of Communication system
CO2	Learning various types of modulation principles
CO3	Distinguishing Frequency and Pulse modulation techniques
CO4	Understanding theories and characteristics of antennas
CO5	Getting idea of satellite communication

Subject Name: LAB: GENERAL PHYSICS

Subject Code: P22PHP11

In this Course, the students will

COs	CO Statement
CO1	Determining the refractive index of a liquid
CO2	Forming Edser-Butler fringes using a sheet and determining its thickness
CO3	Measuring the Young's modulus of a material
CO4	Determining Self inductance of a coil
CO5	Determining Mutual inductance between coils

SEMESTER II

Subject Name: MATHEMATICAL PHYSICS –II

Subject Code: P22PHC21

In this course the students will

COs	CO Statement
CO1	Learning Fourier series and transforms and its applications to physical problems
CO2	Understanding the properties of complex number and integrals and evaluation of definite integrals.
CO3	Getting knowledge of Cauchy's residue theorem
CO4	Understanding the algebra of tensors and their applications to electrodynamics
CO5	Understanding the concept of groups

Subject Name: ELECTROMAGNETIC THEORY

Subject Code: P22PHC22/ P19PHC22

In this course the students will

COs	CO Statement
CO1	Getting knowledge about electrostatic field in vacuum and dielectric media.
CO2	Understanding the general methods for solving Laplace's and Poisson's equations
CO3	Learning to apply mathematical methods to electrostatic problems
CO4	Getting knowledge of magnetic induction and derivation of Maxwell's equations



CO5	Learning about the propagation of an electromagnetic wave through non conductors and conductors and coaxial lines
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Subject Name: QUANTUM MECHANICS - I

Subject Code: P22PHC23

In this course the students will

COs	CO Statement
CO1	Understanding the concept of Wave function
CO2	Getting knowledge of Time-independent Schrodinger equation
CO3	Knowing the formalisms of Quantum mechanics
CO4	Getting knowledge of Quantum mechanics in three dimensions
CO5	Learning the concept of Time-independent perturbation theory

Subject Name: NME- NON CONVENTIONAL ENERGY SOURCES

Subject Code: P22PHN21/ P19PHN21

In this course the students will

COs	CO Statement
CO1	Getting knowledge of conventional and non-conventional energy sources
CO2	Understanding solar energy basics
CO3	Learning about wind energy and its potential applications
CO4	Understanding basic concepts of producing and utilizing bio-mass energy
CO5	Learning about Geothermal tidal and Ocean thermal energy concepts

Subject Name: SOLAR ENERGY SYSTEMS AND STORAGE DEVICES

Subject Code: P22PHE21

In this Course, the students will

COs	CO Statement
CO1	Knowing about Solar energy basics
CO2	Getting knowledge about solar thermal energy systems
CO3	Knowing the potential applications of solar thermal systems
CO4	Understanding fundamentals of solar photovoltaics
CO5	Learning about energy storage devices



Subject Name: LAB: ELECTRONICS

Subject Code: P22PHP21

In this Course, the students will

COs	CO Statement
CO1	Learning to construct and study amplifiers
CO2	Designing amplitude modulator circuits
CO3	Studying construction of Oscillators
CO4	Learning construction of Saw tooth wave generators
CO5	Studying wave shaping properties of clipping and clamping circuits



COURSE OUTCOME

SEMESTER III SOLID STATE PHYSICS – I

Subject Code: P19PHC31

- To understand the structure of crystals.
- To get knowledge about the Imperfections of crystals.
- To study the lattice vibrations.
- To impart the knowledge about energy band theories and band gap in semiconductors.

QUANTUM MECHANICS - II

Subject Code: P19PHC32

- To understand the scattering mechanism in microscopic interactions such as nuclear reactions.
- To understand the fundamentals of Quantum Mechanics using Dirac vector notations and Hilbert space.
- To learn about the operators of total angular momentum, addition of angular momenta and the procedure to evaluate CG coefficients.
- To impart the knowledge about time dependent perturbation theory and its applications to Physics problems.
- To understand the Relativistic Quantum Mechanics using KG equation and Dirac equation.

NUCLEAR AND PARTICLE PHYSICS

Subject Code: P19PHC33

- To understand the Nuclear forces.
- To study Nuclear models.
- To learn Nuclear Reactions.
- To impart the knowledge of Nuclear fission and fusion.
- To study the elementary particles

FIBER OPTIC COMMUNICATION

Subject Code: P19PHE31

- To get fundamental idea about Optical Fiber Communication.
- To understand the structure and types of Optical Fiber.
- To learn about the types of solid state optical sources.
- To understand the different techniques of power Launching & Coupling in optical fiber.
- To get knowledge about Photo detectors.



APPLIED OPTICS

Subject Code: P19PHE32

- To study the matrix methods in Gaussian optics.
- To understand the Fresnel and Fraunhofer diffraction pattern and Fourier Transforming properties of lenses.
- To understand the Frequency analysis of imaging system.
- To learn about the Non-linear optics.
- To learn the laser and its properties.

SEMESTER IV SOLID STATE PHYSICS II

Subject Code: P19PHC41

- To understand the nature of Fermi surfaces in metals.
- To study about the Plasma oscillations.
- To impart the knowledge about super conductivity.
- To understand the electric and magnetic properties of solids.

MOLECULAR SPECTROSCOPY

Subject Code: P19PHC42

- To get knowledge about rotational spectrum of molecules.
- To understand the nature of vibration of molecules.
- To impart the knowledge about Raman spectra of molecules.
- To get knowledge about electronic spectra and spin resonance spectra of molecules.

THERMODYNAMICS AND STATISTICAL MECHANICS

Subject Code: P19PHC43

- To describe the state of the system at equilibrium under temperature, free energy, entropy, internal energy, pressure etc.,
- To discuss the physical properties of matter in bulk on the basis of the dynamical behaviour of its microscopic constituents.
- To study the systems of particles in which statistical equation of state of a substance and its energy equation.
- To describe the statistical thermodynamic parameters for ideal gas and solids

BIOPHYSICS

Subject Code: P19PHE42

- To study the Principle, working of different Microscopes used in Biology.
- To understand the Mechanism of human Ear.
- To get knowledge about different types of Spectroscopy.
- To understand the applications of Bioenergetics.



COURSE OUTCOMES

UNDERGRADUATE

III - Year

V - Semester

Employability Skills

Subject Code: U1PS51

In this course, the students will

CO1:	Enrich them with the employability skills like reasoning skills and aptitude skills.
CO2:	Get adequate exposure to various types of competitive examinations.
CO3:	Get enough training in OMR based answer sheet.



COURSE OUTCOMES

UNDERGRADUATE

I - Semester

Value Education

Subject Code: U1VE11

In this course, the students will

CO1:	Learn to choose their own personal moral and spiritual values.
CO2:	Learn to become responsible citizens.
CO3:	Get sensitized to value formation.